

- ★ Green Device Available
- ★ Super Low Gate Charge
- ★ Excellent CdV/dt effect decline
- ★ Advanced high cell density Trench technology
- ★ 100% EAS Guaranteed

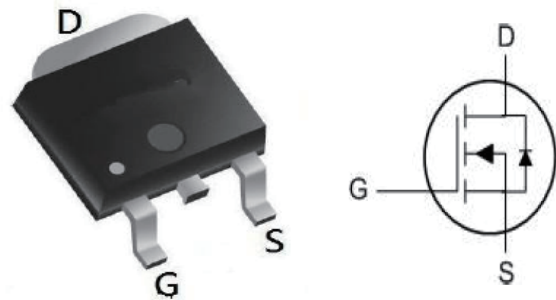
Product Summary

BVDSS	RDS(on)	ID
30V	4.8mΩ	80A

Description

The 80N03 is the high cell density trenched N-ch MOSFETs, which provide excellent RDS(on) and gate charge for most of the synchronous buck converter applications.

The 80N03 meet the RoHS and Green Product, requirement 100% EAS guaranteed with full function reliability approved.

TO252 Pin Configuration

Absolute Maximum Ratings

Symbol	Parameter	Rating		Units
		10s	Steady State	
V_{DS}	Drain-Source Voltage	30		V
V_{GS}	Gate-Source Voltage	±20		V
$I_{D@T_C=25^\circ C}$	Continuous Drain Current, $V_{GS} @ 10V^1$	80		A
$I_{D@T_C=100^\circ C}$	Continuous Drain Current, $V_{GS} @ 10V^1$	50		A
$I_{D@T_A=25^\circ C}$	Continuous Drain Current, $V_{GS} @ 10V^1$	30	19	A
$I_{D@T_A=70^\circ C}$	Continuous Drain Current, $V_{GS} @ 10V^1$	25	16	A
I_{DM}	Pulsed Drain Current ²	192		A
E_{AS}	Single Pulse Avalanche Energy ³	144.7		mJ
I_{AS}	Avalanche Current	53.8		A
$P_{D@T_C=25^\circ C}$	Total Power Dissipation ⁴	62.5		W
$P_{D@T_A=25^\circ C}$	Total Power Dissipation ⁴	6		W
T_{STG}	Storage Temperature Range	-55 to 175		°C
T_J	Operating Junction Temperature Range	-55 to 175		°C

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-Ambient ¹	---	62	°C/W
$R_{\theta JA}$	Thermal Resistance Junction-Ambient ¹ ($t \leq 10s$)	---	25	°C/W
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	---	2.4	°C/W

Electrical Characteristics ($T_J = 25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	30	---	---	V
$\Delta BV_{DSS} / \Delta T_J$	BVDSS Temperature Coefficient	Reference to 25°C	---	0.0213	---	$V/^\circ\text{C}$
$R_{DS(on)}$	Static Drain-Source On-Resistance ²	$V_{GS}=10V, I_D=30A$	---	4.8	6	m Ω
		$V_{GS}=4.5V, I_D=15A$	---	7.8	9	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\mu A$	1	1.5	2.5	V
$\Delta V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	-5.73	---	$mV/^\circ\text{C}$
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=24V, V_{GS}=0V,$	---	---	1	μA
		$V_{DS}=24V, V_{GS}=0V,$	---	---	5	
I_{GSS}	Gate-Source Leakage Current	$V_{GS} = \pm 20V, V_{DS}=0V$	---	---	± 100	nA
g_{fs}	Forward Transconductance	$V_{DS}=5V, I_D=30A$	---	26.5	---	S
R_g	Gate Resistance	$V_{DS}=0V, V_{GS}=0V,$	---	1.4	2.8	Ω
Q_g	Total Gate Charge (4.5V)	$V_{DS}=15V, V_{GS}=4.5V,$ $I_D=15A$	---	31.6	---	nC
Q_{gs}	Gate-Source Charge		---	8.6	---	
Q_{gd}	Gate-Drain Charge		---	11.7	---	
$T_{d(on)}$	Turn-On Delay Time	$V_{DD}=15V, V_{GS}=10V,$ $R_G=3.3\Omega, I_D=15A$	---	9	---	ns
T_r	Rise Time		---	19	---	
$T_{d(off)}$	Turn-Off Delay Time		---	58	---	
T_f	Fall Time		---	15.2	---	
C_{iss}	Input Capacitance	$V_{DS}=15V, V_{GS}=0V,$ $f=1\text{MHz}$	---	3075	4000	pF
C_{oss}	Output Capacitance		---	400	530	
C_{rss}	Reverse Transfer Capacitance		---	315	---	

Absolute Maximum Ratings

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current ^{1,5}	$V_G=V_D=0V, \text{Force Current}$	---	---	80	A
I_{SM}	Pulsed Source Current ^{2,5}		---	---	132	A
V_{SD}	Diode Forward Voltage ²	$V_{GS}=0V, I_S=1A, T_J=25^\circ\text{C}$	---	---	1	V
t_{rr}	Reverse Recovery Time	$I_F=30A, dI/dt=100A/\mu s, T_J=25^\circ\text{C}$	---	18	---	nS
Q_{rr}	Reverse Recovery Charge		---	8	---	nC

Note :

- The data tested by surface mounted on a 1 inch² FR-4 board with 20Z copper.
- The data tested by pulsed, pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$
- The EAS data shows Max. rating. The test condition is $V_{DD}=25V, V_{GS}=10V, L=0.1mH, I_{AS}=53.8A$
- The power dissipation is limited by 175°C junction temperature
- The data is theoretically the same as I_D and I_{DM} , in real applications, should be limited by total power dissipation

Typical Electrical and Thermal Characteristics (Curves)

Figure 1: Typical Output Characteristics

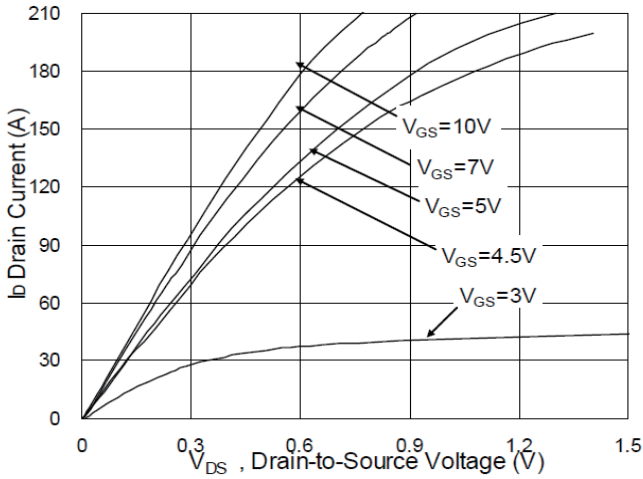


Figure 2: On-Resistance vs. G-S Voltage

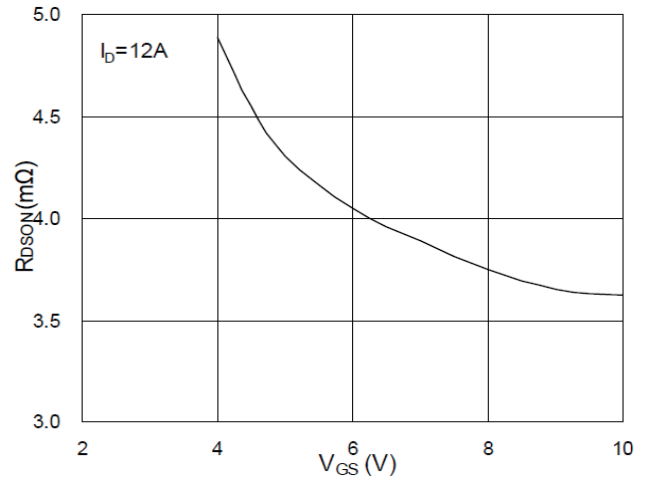


Figure 3: Forward Characteristics of Reverse

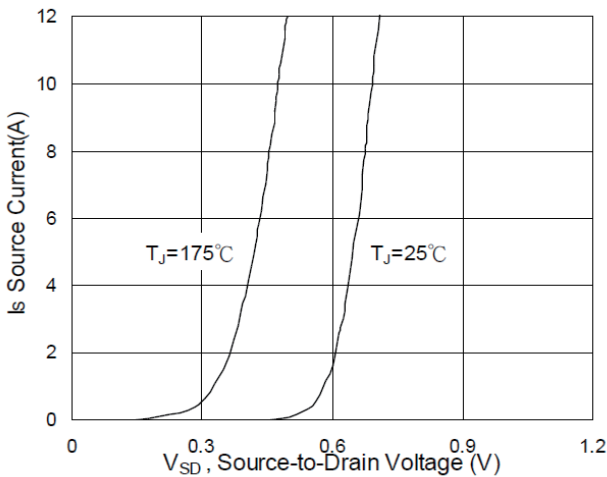


Figure 4: Gate-Charge Characteristics

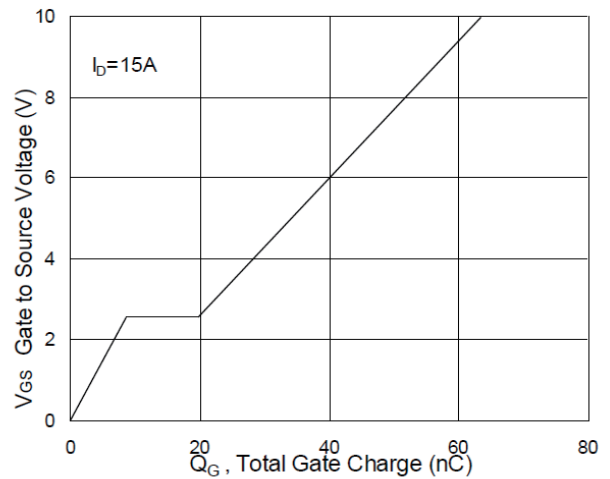


Figure 5: Normalized VGS(th) vs. TJ

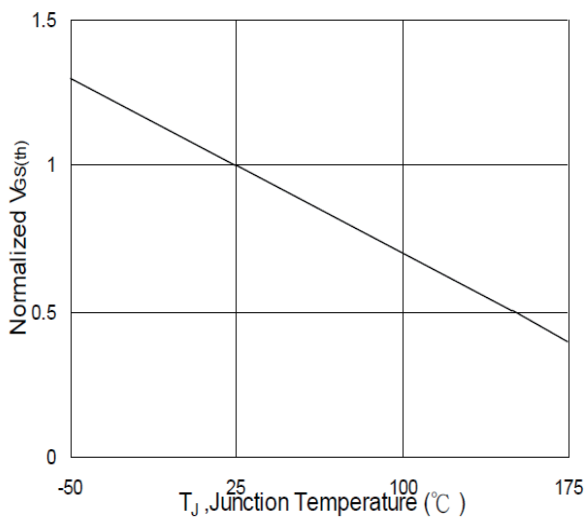
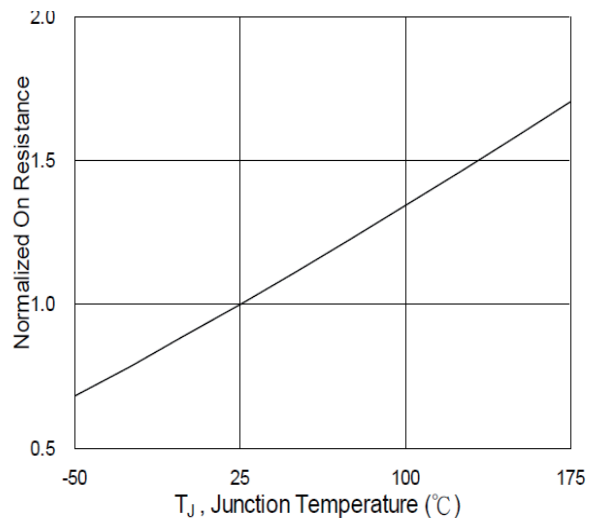


Figure 6: Source- Drain Diode Forward



Typical Performance Characteristics

Figure 7: Capacitance

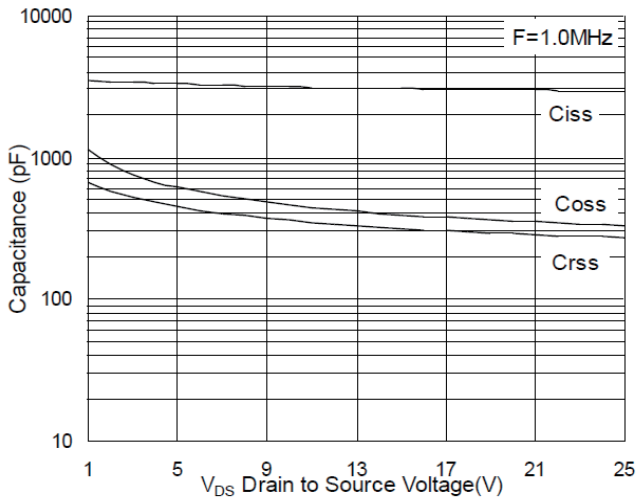


Figure 8: Safe Operating Area

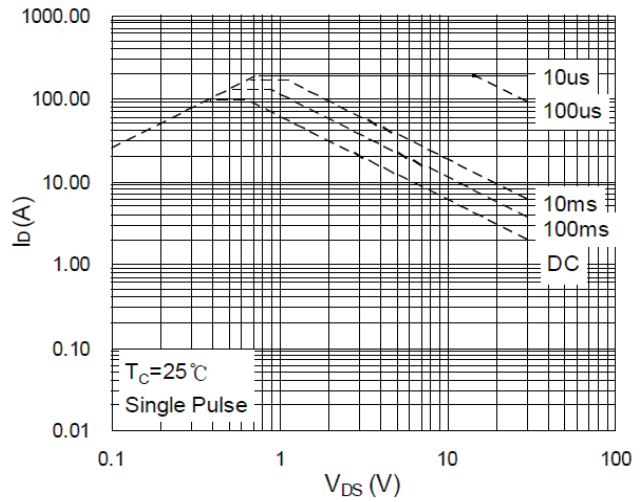


Figure 9: Normalized Maximum Transient Thermal Impedance

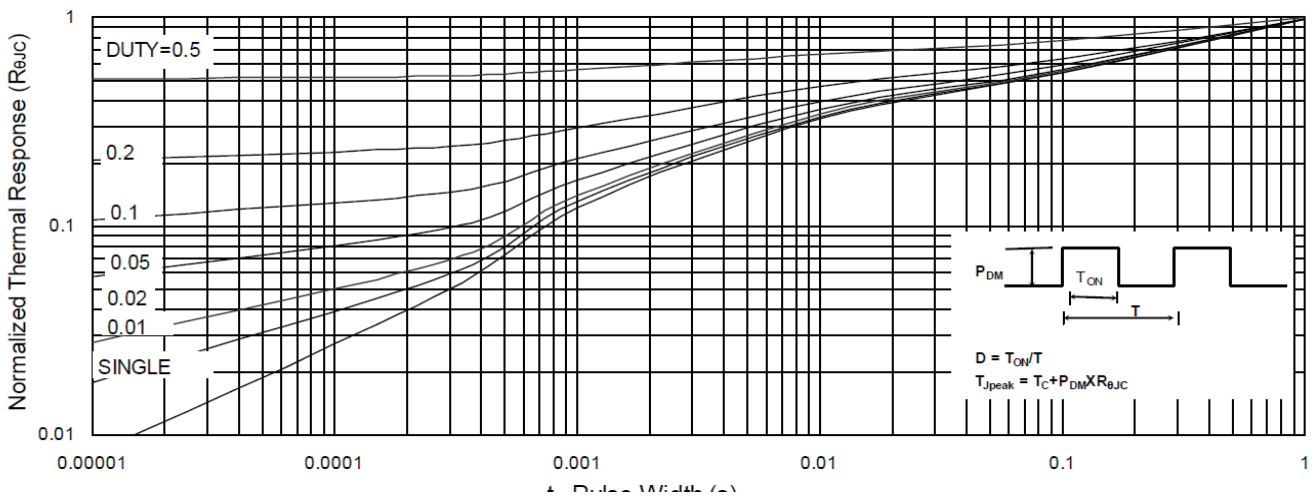


Figure 10: Switching Time Waveform

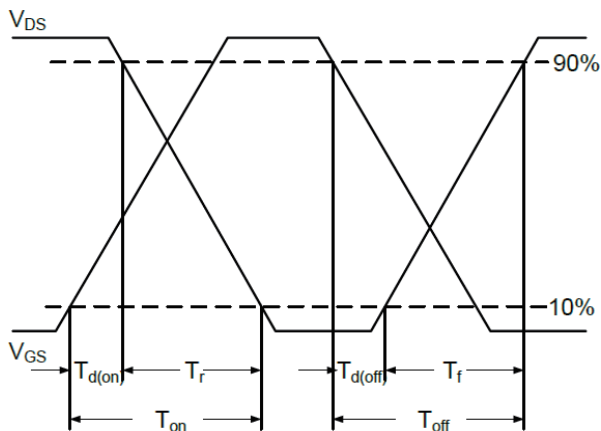
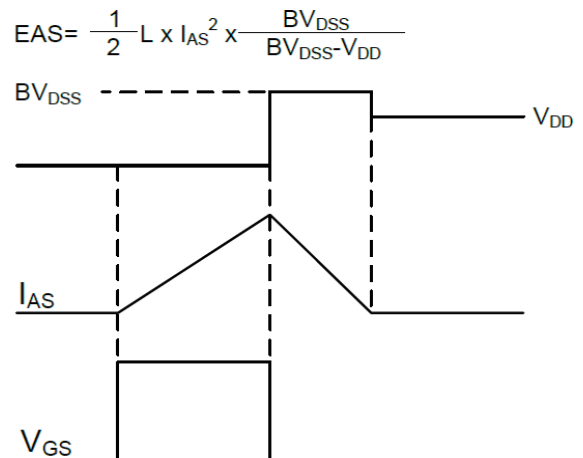
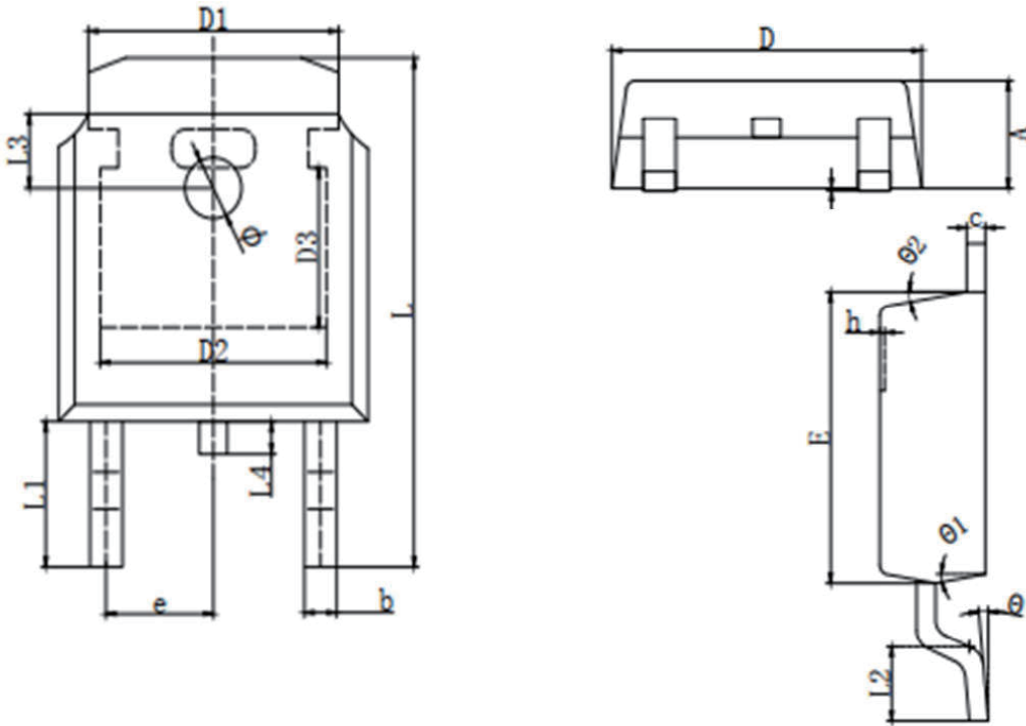


Figure 11: Unclamped Inductive Switching



$$EAS = \frac{1}{2} L \times I_{AS}^2 \times \frac{BV_{DSS}}{BV_{DSS} - V_{DD}}$$

TO-252 Package outline



Symbol	MILLMETER		Symbol	MILLMETER	
	MIN	MAX		MIN	MAX
A	2.200	2.400	h	0.000	0.200
A1	0.000	0.127	L	9.900	10.30
b	0.640	0.740	L1	2.888REF	
c	0.460	0.580	L2	1.400	1.700
D	6.500	6.700	L3	1.600REF	
D1	5.334REF		L4	0.600	1.000
D2	4.826REF		∅	1.100	1.300
D3	3.166REF		θ	0°	8°
E	6.00	6.200	θ ₁	9° TYP2	
e	2.286TYP		θ ₂	9° TYP	

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